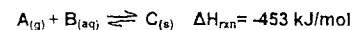


ANSWER

Le Châtlier's Principle

Explain how the following changes in reaction conditions will affect the position of the equilibrium below, and explain your reasoning.



- 1) The pressure of A in the reaction chamber is increased.
right
- 2) The temperature of the reaction is increased by 20° C.
left
- 3) A catalyst is added to the system.
no effect
- 4) As the reaction progresses, more of compound B is steadily added to the reaction chamber.
right
- 5) An inhibitor is added to the reaction chamber.
no effect
- 6) Product C is removed.
right
- 7) The Volume is increased.
left

Use Le Chatelier's Principle to describe the effect of the following changes on the position of the equilibrium.

- ① The equilibrium is: $N_2O_3(g) \rightleftharpoons NO(g) + NO_2(g)$.
a) increase the [NO] *right* c) increase the pressure by decreasing the volume *right*
b) increase the [NO] *right* d) add a catalyst *no effect*
- ② The equilibrium is: $2 H_2(g) + 2 NO(g) \rightleftharpoons N_2(g) + 2 H_2O(g)$.
a) decrease the [N₂] *right* c) decrease the pressure by increasing the volume *right*
b) decrease the [NO] *right* d) add a catalyst *no effect*
- ③ The equilibrium is: $2 CO(g) + O_2(g) \rightleftharpoons 2 CO_2(g) + 566 \text{ kJ}$.
a) increase the temperature *left* c) introduce a catalyst *no effect*
b) increase the [O₂] *right* d) add a catalyst *no effect*
- ④ The equilibrium is: $I_2(g) + Cl_2(g) \rightleftharpoons 2 ICl(g)$; $\Delta H = 35.0 \text{ kJ}$.
a) decrease the temperature *right* c) increase the pressure by decreasing the volume *right*
b) decrease the [Cl₂] *right* d) add a catalyst *no effect*

For each of Exercises 21 – 23, describe the effect on the concentration of the bold substance by the following changes. Write INC for increase, DEC for decrease or NC for no change.

- ⑤ The equilibrium is: $N_2(g) + 3 H_2(g) \rightleftharpoons 2 NH_3(g)$; $\Delta H = -92 \text{ kJ}$.
a) increase the [N₂] *right* c) increase the volume *left*
b) increase the temperature *left* d) add a catalyst *no effect*
- ⑥ Write the equilibrium expressions for the following.
a) $2 ICl(g) \rightleftharpoons I_2(g) + Cl_2(g)$ f) $CaC_2(s) + 2 H_2O(l) \rightleftharpoons C_2H_2(g) + Ca(OH)_2(s)$
b) $N_2(g) + O_2(g) \rightleftharpoons 2 NO(g)$ g) $C_6H_6(l) + Br_2(l) \rightleftharpoons C_6H_5Br(l) + HBr(g)$
c) $3 O_2(g) \rightleftharpoons 2 O_3(g)$ h) $Cu(s) + 2 Ag^+(aq) \rightleftharpoons Cu^{2+}(aq) + 2 Ag(s)$
d) $2 Bi^{3+}(aq) + 3 H_2S(g) \rightleftharpoons Bi_2S_3(s) + 6 H^+(aq)$ i) $4 NH_3(g) + 5 O_2(g) \rightleftharpoons 6 H_2O(g) + 4 NO(g)$
e) $CaCO_3(s) \rightleftharpoons CaO(s) + CO_2(g)$ j) $H_2(g) + 1/2 O_2(g) \rightleftharpoons H_2O(l)$

- ⑦ Write the K_{eq} expression for:
a) $N_2O_4(g) \rightleftharpoons 2 NO_2(g)$, and $K = \frac{[NO_2]^2}{[N_2O_4]}$
b) $2 NO_2(g) \rightleftharpoons N_2O_4(g)$.

- ⑧ Examine the relationship between the K_{eq} expressions for equations (a) and (b) of this question. If $K_{eq} = 10.0$ for equation (a), what would be the value of K_{eq} for equation (b)?

Write the K_{eq} expression for:
a) $SO_2(g) + 1/2 O_2(g) \rightleftharpoons SO_3(g)$, and
b) $2 SO_2(g) + O_2(g) \rightleftharpoons 2 SO_3(g)$.

Examine the relationship between the K_{eq} expressions for equations (a) and (b) of this question.

Chem 122 Review Assignment Ch 14-Due:

Neatly do the following questions on looseleaf. Show all formulas, steps of work and units for full credit.

1. Do question 15 on p 513. This uses The Equilibrium Law(p 487) and p 492 (Le Chateliers Principle.)
2. Do p 513 #19
3. Do #20 to # 22 on p 513, AND #24 on p514 These Questions are like #17 to 21 on p 499(which you have already done.)
4. Write down the formula for Ka. Use this formula to do #32 on p 514.(please omit the last part asking about how the pH might change) Now use this formula for #33 on p 514(please look up the Ka of Boric acid first.)
5. Write down the formula for Kb. Use this formula to do #35 on p 514. Note: you must find the Ka using the Ka formula first, then use the Kw formula to find Kb.
6. Do #18 on p 513
7. Check all answers with p 576 in your textbook.
8. Please read chapter 14 two times. Make up five questions about your reading.